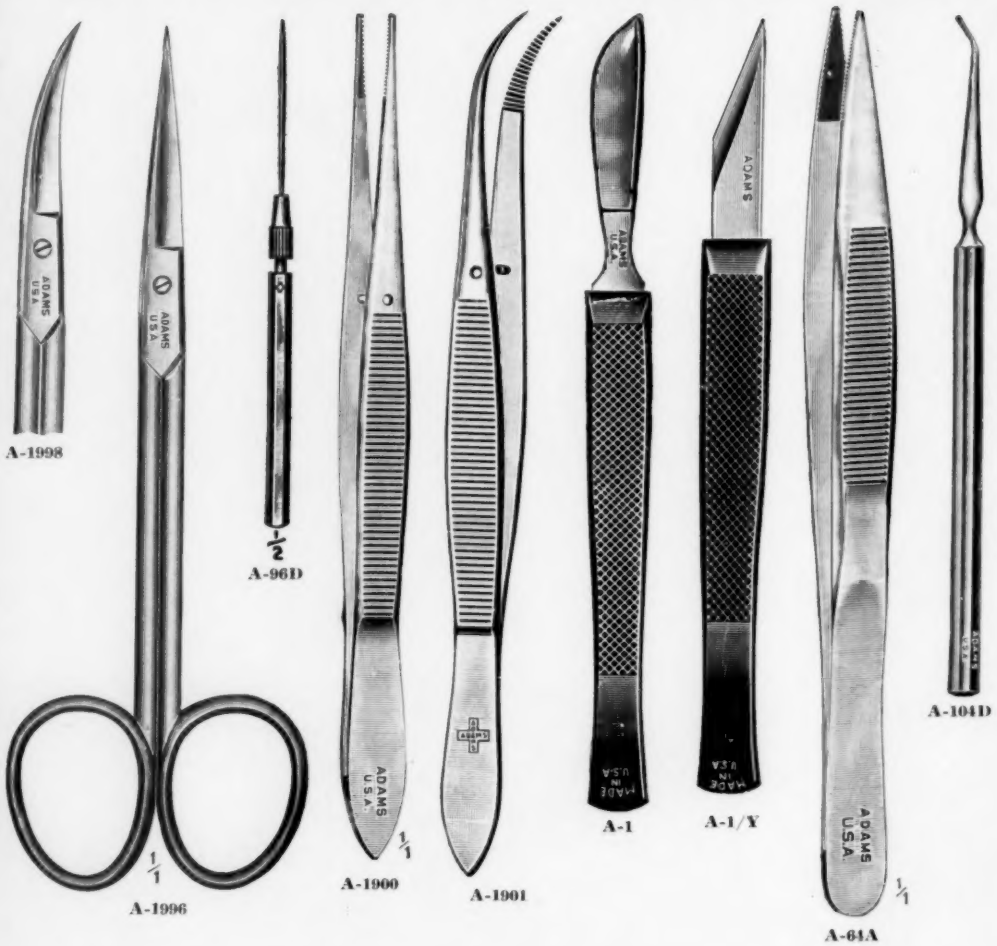
The American Biology Teacher

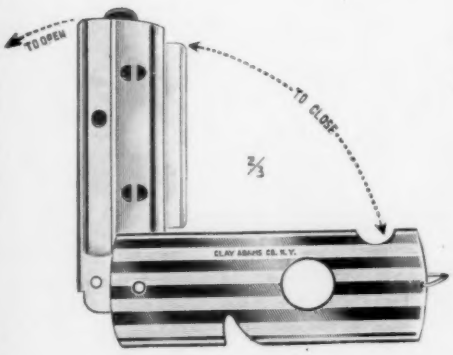
VOL. 1 OCTOBER, 1938 NO. 1

PUBLISHED BY
The National Association of Biology Teachers

AMERICAN MADE DISSECTING INSTRUMENTS



A-1998 A-1996 A-96D A-1900 A-1901 A-1 A-1/Y A-61A A-104D



Bakellte handles of perfect balance and scientifically designed for maximum efficiency and comfort have molded into them scalpel blades made of highest grade cutlery steel.

A–40 Razor blade Knife "Super–Knife"

Takes standard double edge razor blade. Particularly well adapted for use in the biology laboratory, but also generally useful. Note that the blade can be turned around or changed in a jiffy and that the full length of the cutting edge can be used. Each in envelope with directions.

Our special catalog No. 125 illustrates and describes our complete line of "Dissecting Instruments and Sets, and Science Students Supplies." *A copy will be gladly sent on request.*

Quotations gladly supplied—please mention quantity.

CLAY-ADAMS CO., Inc., 25 East 26th St., New York

The American Biology Teacher

Vol. 1 OCTOBER, 1938 No. 1

Biology Teachers Begin to Pull Together

OSCAR RIDDLE
Carnegie Institution of Washington

I

Every one knows that the general education and enlightenment of a people really rest upon its primary and secondary schools. Colleges and the several other educational accessories either reach too few individuals (colleges, museums), or the quantity and the quality of these accessory contributions (radio, movies, newspapers, books, etc.) are vitally limited and determined by whatever was supplied by those earlier periods of instruction.

Every biologist knows that his science —the life-sciences—can extend the mental horizon, give better health, improve the economic status and promote the social understanding of any people or nation that will teach the subject adequately to its youth. The peoples of India and China are restrained far more by ignorance of simple biological truth than by unfamiliarity with letters, arithmetic or the rules of trade. It is both a nation and a cult who, through Mahatma Gandhi, still say: "We have no right to take the lives of mosquitoes, flies, lice, rats or fleas. They have as much right to live as we."

Many teachers of secondary school biology, many professional biologists, some leading educators and some interested and observing citizens of our country have become convinced that the teaching of biological science in the schools of the United States now urgently needs to be fortified and advanced. These groups hold in common that a citizenship acquainted with the principles and subject matter of the life-sciences is vital to our national welfare; that even the past and present inadequate place of these subjects in the school curriculum is threatened in the schools of many cities and States; and that new means should be found for supplying to our people the more and better biology teaching to which they are entitled.

II

Through the efforts of the above-named groups an important new means of advancing the teaching of biology in the secondary schools of the United States is just now coming into existence. Though there are perhaps 20,000 teachers of biology in our secondary schools those teachers have hitherto had no national organization (and very few State or city organizations) and no journal to give them help, encouragement, and a voice. And though this large and much scattered group of teachers is charged with the great obligation (and opportunity) of giving a priceless instruction to a nation no scientist, citizen, educator or statesman has been able to communicate directly and specifically with them.

The appearance of this (first) issue of *The American Biology Teacher* provides evidence that part of a mechanism through which the biology teacher may speak, and through which others may speak with him, is coming to hand. This journal is the property and official organ of the *National Association of Biology Teachers*—an organization formally started on July 1, 1938, in New York City (immediately following meetings of the N. E. A.). This association, though launched and named—and possessing a Journal—is nevertheless still quite incomplete. When, or if, it enrolls most of those who teach secondary school biology—and others with allied interests—it can accomplish much or most of the purposes which are calling it into existence. A fine background of encouragement is found in the fact that already these biology teachers have shown intention to pull together.

It seems necessary to set down here a few additional facts concerning this Association. This will be done for two reasons. First, in order that every teacher of biology who may read this article may understand how completely this organization is in the hands, and under its Constitution (see elsewhere in this issue) must remain in the control, of teachers of secondary school biology. Second, to emphasize in the strongest possible way the opportunity and obligation which rests upon every teacher of secondary school biology to take membership in this Association, and also to urge similar action upon his several colleagues who can not possibly have received or read the information regarding the National Association of Biology Teachers which is contained in this (first) issue of *The American Biology Teacher*. The membership dues of $1.00 per year pays for the eight annual issues of the official journal. Membership and dues should be sent to the secretary of the Association, Mr. P. K. Houdek, Robinson, Ill.

The several professional biological societies of this country, through the Union of American Biological Societies, is sharing to some extent in the movement described here. In June 1936 the Union appointed a committee (five members) on biological science teaching. That committee, assisted at present by funds granted by the Carnegie Foundation for the Advancement of Teaching, is already concerned with still other projects, but in its view it is now of paramount importance to establish the National Association and the official journal being described here. The committee has assisted the formation of local units of the National Association—and will continue to do so. The meeting of July 1 in New York was called and largely financed by this committee of the Union of American Biological Societies. Delegates to the organization meeting were selected by local units of biology teachers in a dozen States. Though most of

the delegates represented only a city or a smaller region of their State, the following States or regions thus participated in the task of organizing this new Association: Chicago, Pennsylvania, New York City, Ohio, Illinois, Virginia, Michigan, Kansas, New England Biological Association, Indiana, Kentucky.

The Association has elected its first group of officers and will of course at all times determine its own policies. Its present membership is approximately 1500 and these members reside in nearly 40 States. The committee on the teaching of biology will continue to assist the National Association in such ways as it finds practicable, and particularly by assisting in increasing its membership and in the formation of local units in all of the 48 States. In what way or to what extent local units or groups (city, district, State) wish to hold local meetings will or course be determined by each unit for itself—and many or most members may be unable to attend any meetings whatever—but it may be pointed out that in many other cases such organized groups of biology teachers will be in favorable position to secure advantages (demonstrations, lectures, excursions, etc.) not otherwise obtainable. Indeed, when the large body of secondary school biology teachers has found opportunity to express its needs and wishes this committee may find additional ways of serving them, their localities, and their Association.

It is well worth noting that membership in the National Association of Biology Teachers will doubtless give free and automatic membership in the Union of American Biological Societies. At its meeting in Atlantic City on December 27, 1936, the delegates of the Union voted their readiness, upon proper application, to extend membership to the proposed National Association of Biology Teachers when such an organization might be completed. That application will be properly presented in December, 1938, at the meetings of the American Association for the Advancement of Science at Richmond, Va. It is further notable that the present membership in the Union is composed of 30 professional biological societies and four sections of the American Association for the Advancement of Science.

III

It is possible that the several life-science departments of our colleges and universities will need to provide courses better suited to the training of those who are to carry this subject into secondary education; possible that schools of education and teachers colleges have insisted upon too much pedagogical training and have thus left too little opportunity for a good grounding in life-science; possible that some State legislatures have written too much of these pedagogical and other requirements into law; and possible that college entrance requirements react unfavorably upon either the maintenance or the extension of courses in high school biology. But—though these and other restricting influences known to biology teachers may exist—there is scant hope of amelioration of any of these influences until and unless the thought and experience of the present body of biology teachers can be obtained on these subjects. And, of course, it is only an associated body that can speak at all.

In many places throughout the United States the high school curriculum is being subjected to extensive revision, with social studies claiming place as a core subject and displacing some of the biology that was formerly taught. In many places too the bit of hygiene and physiology which are taught are being torn from their normal life-science con-

nections and taught under physical education. Again, in the prevalent reorganization of courses under the name of 'general science,' instruction in biology has often or usually suffered notably; and, *no other* existing teachers organization is at all in position to defend and extend life-science instruction in our secondary schools. Very adverse also is the impression widespread in many smaller schools that the biology course can be taught satisfactorily by someone who has had little or no training in biological science. Knowing that every bad, vacuous or unscientific course of biological instruction that has been or is now given in our secondary schools serves to jeopardize the place of life-science in the education of our people let us at once utilize to a maximum the strength that this new National Association can develop.

The National Association of Biology Teachers Constitution*

ARTICLE I

Name

The name of this association shall be The National Association of Biology Teachers.

ARTICLE II

Objectives

The purpose of this association shall be to organize the biology teachers on a national basis by local units of biology teacher associations in order to:

a. Facilitate the dissemination of that biological knowledge which is most vitalizing and useful to the public in every day life.

b. Encourage scientific thinking and the utilization of the scientific method through the teaching of biology.

c. Make available to teachers; information concerning the selection, organization and presentation of biological materials; and the relationship of their subject to other sciences and education as a whole.

d. Provide a national journal dedicated to the foregoing objectives.

ARTICLE III

Membership

SECTION 1. Membership in this association shall be open to all who are interested in the teaching of biological science.

SECTION 2. Payment of dues shall be a prerequisite for obtaining membership.

ARTICLE IV

Officers and Executive Board

SECTION 1. The officers of this association shall consist of a president, president elect, first vice president, second vice president and secretary-treasurer.

SECTION 2. The executive board shall

---

* This constitution was drawn up and approved by the following elected delegates who met in New York City on July 1, 1938, for this purpose:

Adell, J. C., Ohio
Campbell, M. D., Mass.
Hatcher, H. E., Mich.
Heiss, E. D., Penn.
Herskowitz, I. A., N. Y.
Houdek, P. K., Illinois
Jeffers, G. W., Virginia
Lichtenwalter, M. C., Ill.
Mann, P. B., N. Y.
Orenstein, Lucy, N. Y.
Mitchell, J. S., Kent.
Scherff, E. E., Illinois
Trent, J. A., Kansas
Vance, B. B., Ohio
Whitaker, P. L., Indiana

In addition, the following men represented the committee on biological teaching organized by The Union of American Biological Societies:

Dr. Oscar Riddle, Carnegie Institute
Dr. F. L. Fitzpatrick, Columbia University
Dr. D. F. Miller, Ohio State University.

consist of the president, president elect, first vice president, second vice president, secretary-treasurer, editor-in-chief of the journal and managing editor of the journal.

ARTICLE V

Meetings

National or regional membership meetings shall be called by a majority vote of the executive board.

ARTICLE VI

Amendments

SECTION 1. An amendment to this constitution may be proposed by any affiliated chapter of biology teachers. Such proposed amendments to this constitution shall then be published in the official journal or by written notice to all members at least sixty (60) days before being voted upon by the executive board. Such proposed amendments shall also require a favorable vote of four fifths (4/5) of the executive board.

SECTION 2. Any member or group of members may submit his or their written opinion on such proposed amendments to the secretary-treasurer at least ten days before being voted upon by the executive board. It then becomes the duty of the secretary-treasurer to make available to the members of the executive board for their consideration those opinions that have been submitted prior to being voted upon.

BY-LAWS

ARTICLE I

Term of Office and Duties of Officers

SECTION 1. The term of office shall be for a period of one year. No office shall be held by the same person for more than five terms except the office of secretary-treasurer.

SECTION 2. The president shall preside at all meetings of both the association and the executive board. He shall appoint, subject to the approval of the board, all committees not provided for otherwise. He shall be an ex-officio member of these committees. He shall sign with the secretary-treasurer all vouchers drawn upon the treasury. He shall in every way endeavor to promote the interests of the association.

SECTION 3. The president elect shall assume all duties of the president in case of the absence of the president. The president elect shall succeed to the office of president the following year.

SECTION 4. The duties of the vice presidents shall be to aid the president. They shall assist the president in the furtherance of the work and the progress of the association.

SECTION 5. The secretary-treasurer shall keep a permanent accurate record of the proceedings of each of the meetings of the association and the executive board. He shall keep on file a correct list of the names of the executive board members; and a list of the members of the association, their mailing addresses and a statement of their standing. He shall assist the president in carrying on the correspondence of the association. He shall receive for deposit all funds belonging to the association. He shall keep an itemized account of all receipts and expenditures and make a written report of the same to the membership regularly. The books shall be audited annually by a certified public accountant or by a special auditing committee of three members, no one of which is a member of the executive board.

ARTICLE II

Nominations and Elections of Officers

SECTION 1. A nominating committee of five class room teachers that are members in good standing in the association shall be appointed by the executive board. This committee shall make nominations for the offices of president elect, first vice-president, second vice president and secretary-treasurer, in conformance with section four of this acticle.

SECTION 2. Additional nominations may be made by petition. Any local affiliated chapter may present a petition signed by at least half of its chapter membership and listing the name or names of the nominations and the offices for which the nominations were made. Signers of such a petition should be members in good standing in the national association. Furthermore the petition should contain the signatures of at least fifty members.

If this number is in excess of the membership of the local affiliated chapter, other qualified members may be substituted for the additional number. When such petitions are presented to the secretary-treasurer he shall place the additional nominations on the ballots.

SECTION 3. Ballots shall be mailed by the secretary-treasurer to all members in good standing at least sixty (60) days before the annual election of officers. The secretary-treasurer may at his discretion in lieu of the preceding statement of this section include the ballots in a regular issue of the journal. Balloting shall be secret and arrangements for counting them shall be provided for by the executive board. The person receiving the majority of the votes cast for an office shall be elected.

SECTION 4. At all times a majority of the executive board shall be class room teachers of biology below the college level.

SECTION 5. Vacancies in office created during a term shall be filled by appointment by the executive board for the unexpired term.

ARTICLE III

Duties of the Executive Board

In addition to the duties herein specified the executive board shall have the power to regulate the association on matters not specifically mentioned herein.

ARTICLE IV

Membership and Dues

SECTION 1. The membership dues of this association shall be one dollar ($1.00) per year payable in advance. This membership includes subscription to the official journal.

SECTION 2. Any member refusing or neglecting to pay dues may at the discretion of the secretary-treasurer forfeit membership in this association.

SECTION 3. Those who on or before July 1, 1938, were members of an organization maintaining a periodical dealing exclusively with biological education on a secondary school level are entitled to membership in this association on payment of special dues of twenty-five cents (25¢) per year. This special dues membership does not include subscription to the official journal.

ARTICLE V

The Journal

The official journal of this association shall be named "THE AMERICAN BIOLOGY TEACHER."

ARTICLE VI

Officers and Boards of the Journal

SECTION 1. The official journal shall be controlled by an editorial board consisting of an editor-in-chief, a managing editor and a number of associate editors. The editor-in-chief shall be chairman of the editorial board. The members of the editorial board shall be appointed by the executive board. At least one half of the editorial board shall be class room teachers of biology below the college level.

SECTION 2. An advisory board composed of not more than twelve (12) members shall be appointed by the executive board to assist and advise the editorial board.

ARTICLE VII

Chapter Affiliation

SECTION 1. Any active local state or regional biology teachers association having a membership of at least twenty-five and holding regular meetings may affiliate as a chapter of this association by petitioning the executive board for such affiliation. A favorable vote of three-fourths of the executive board shall be required for such sanction. The affiliating chapter agrees to comply with the then existing constitution and by-laws of this association.

SECTION 2. Any active chapter may of its own volition, by petitioning the executive board for such a privilege, collect the regular national association dues together with such local assessments of their chapter from their members. All national dues so collected together with a list of those contributing such dues as members shall be sent promptly to the national secretary-treasurer for credit to the individual members. Any chapter making such collections must annually submit their books to the executive board to be audited by an auditing committee.

SECTION 3. Any active chapter of their own volition may, by petitioning the executive board for such privileges, con-

duct the regular elections for national officers among their members that are members of the national association. In conducting such elections they must comply with the rulings of the executive board for such elections. The ballot must be secret. The results of such an election must be mailed immediately directly to the national secretary-treasurer. The results of such an election shall be considered as a part of the national election and the votes shall be counted together with the others submitted.

SECTION 4. Any affiliated chapter failing to comply with section 1 of this article shall be considered as an inactive chapter and shall forfeit such privileges in the national association. Furthermore any chapter having been granted, by the executive board, privileges to participate in the benefits of sections 2 or 3 or both and failing to comply with the provisions of the same shall automatically forfeit such privileges. Any individual member of such a chapter shall not forfeit his individual membership and privileges in the national association provided he complies with the regulations governing individual memberships.

ARTICLE VIII

Affiliation with Similar Organizations

Affiliations with other national organizations with allied interests can be proposed only by a favorable vote of three-fourths of the entire executive board. If within a year's time after announcement of such a proposed affiliation, one-fourth of the total membership records in written form its disapproval of such a proposed affiliation that proposal shall thereby be cancelled. If such a dissenting vote is not recorded within one year's time the proposed affiliation shall automatically become binding upon the association.

ARTICLE IX

Amendments to the By-Laws

SECTION 1. An amendment to these by-laws may be proposed by any affiliated chapter of biology teachers. Such proposed amendments to these by-laws shall then be published in the official journal or by written notice to all members at least sixty (60) days before being voted upon by the executive board. Such proposed amendments shall also require a favorable vote of four-fifths (4/5) of the executive board.

SECTION 2. Any member or group of members may submit his or their written opinion on such proposed amendments to the secretary-treasurer at least ten days before being voted upon by the executive board. It then becomes the duty of the secretary-treasurer to make available to the members of the executive board for their consideration those opinions that have been submitted prior to being voted upon.

Notices

DUES NOW PAYABLE

Those who pledged their memberships through a local, state or regional organization may remit their dues of $1.00 through the national representative of their organization.

Those who pledged their membership to Dr. Riddle or Dr. Miller should send their dues of $1.00 to the secretary-treasurer, Mr. P. K. Houdek, Township High School, Robinson, Illinois.

Any member may, if it is more convenient, remit their dues direct to the secretary-treasurer.

As rapidly as the dues are received by the secretary-treasurer membership cards certifying payment will be sent to the individual members.

In some cases dues and memberships have passed through three or four hands before reaching the secretary-treasurer. Any member who does not receive a membership card within a reasonable time after transmitting dues should communicate with the secretary-treasurer, Mr. P. K. Houdek, Township High School, Robinson, Illinois, giving the date dues were paid and to whom they were paid.

Biology Teaching Aids

TO DEMONSTRATE MOSS PLANTS

which are easily broken or lost on laboratory tables, fasten the moss plant on a microscope slide with gummed transparent mending tape.

THE CIRCULATION OF BLOOD

in the external gills of young tadpoles may be demonstrated in a cell slide under low power magnification and may be projected on a screen with a microprojector.

INEXPENSIVE CAGES

for small animals may be made from any well made can with a good cover. Cut large windows in the sides and solder in pieces of ¼-inch mesh hardware cloth.

A SEINE FOR SMALL ANIMALS

may be made from four yards of mosquito netting fastened to poles that can be found or cut along most any stream.

STORAGE CANS

for soils, sand, gravel and small flower pots may be made from lard cans, large paint cans, or containers in which sweeping compounds are often shipped. A coat of light green paint will make them look a bit more "official."

POTTING SOIL

for many of the plants commonly grown in the laboratory may be made on the following formulae:

½ good garden soil *or* woods soil
¼ leaf mold *or* well rotted manure
¼ clean fresh-water sand.

After being thoroughly mixed, it should be strained through ¼- or ½-inch mesh hardware cloth.

BULBS FOR THE LABORATORY

may be potted as soon as they are available in the fall. Hyacinths, tulips and daffodils are the three favorites. Better flowers will result if the larger size bulbs are used. Most of the darwin tulips are not well suited to pot culture because of their height. Most of the breeder, cottage, or early varieties of tulips are well suited to pot culture. In the northern states the potted bulbs should be buried three or four inches under ground where they will receive plenty of water but have good drainage. Roots develop during the fall and early winter. During January, February and March the potted bulbs may be dug out of the frozen ground and brought into the laboratory to bloom. Protect the shoots from direct sunlight for a few days and then give them plenty of light and water. Ordinary temperatures of the laboratory will be satisfactory. Secure two or three bulb catalogues to aid you in your selection.

FOSSIL MOUNTS

Wallboard, either surfaced or rough, makes an excellent backing for large specimens such as fossils. The material may be wired on to it and the board is sufficiently rugged so that it will stand a great deal of rough usage. Some of the thicker boards may be cut into various shapes with a jig saw and serve as the basis for models.

DRAWING AID

A simple *Drawing Aid* can be made from an old camera slide from which the emulsion has been removed. If it is desired to make a symmetrical drawing.

one side can be drawn free-hand and then the glass plate held vertically along the mid-line of the drawing. By viewing the drawing at the correct angle through the plate, the reflection will appear on the opposite side and can be easily traced.

CHARTS

Charts and Tables can be made on cheap, smooth-surfaced window curtains. Students with artistic ability will find this a type of project possessing a good deal of appeal.

X-RAY PICTURES

X-Ray Negatives may be obtained from either the school physician or a local doctor. These are of considerable value in showing the actual relation of body parts to each other. Display frames for these, or other transparencies, may be made by mounting two sheets of glass in a wooden block and standing them in front of a source of light. If the rear sheet of glass is ground, the light will be more evenly distributed.

SOAP MODELLING

Soap can be used as a material from which models are made. The only materials necessary for making such models are a fairly soft soap (laundry soap is usually too hard and brittle), "orange-wood sticks" (manicure sticks), a sharp knife for smoothing the surface of the cake of soap, and some carbon paper. A drawing of an appropriate size is made on ordinary paper and then transferred to the smooth side of a cake of soap by means of the carbon paper. The areas between the parts which are to be shown in relief are gouged out with the sticks. regions may be colored with cheap water colors and the whole cake shellaced to prevent warping as it dries out.

GELATIN MOUNTING

Small specimens which are to be mounted in liquid can be fastened to a glass plate by means of gelatin. The gelatin should be dissolved in hot water in a concentrated solution. After it has cooled somewhat, but before it begins to harden, a drop should be put on the mounting plate and the object oriented in its proper position. On thorough cooling it will be found that the object has adhered very strongly, and if the specimen is mounted in formaldehyde, a chemical reaction between the gelatin and the formalin makes the adhesive stronger. It will not dissolve. A small amount of acetone added to the solution will make the gelatin more transparent.

Exchange Service

The purpose of this exchange service is to stimulate a friendly exchange of specimens and materials between members of the Association. The journal and Association assume no responsibility in connection with the exchanges. It is strongly urged that there be no money exchanged. There is no charge for this service to members of the Association.

Listings should be limited to two or three items wanted and available. Listings will be carried in the journal as long as the space available permits. All requests should be sent to the editor-in-chief.

P. K. Houdek, Township High School, Robinson, Illinois. Can supply: Preying Mantids, Coal Fossils, Corn Specimens. Would like to receive: Small Marine Animals, Lubber Grasshoppers, Tropical Epiphytes.

D. F. Miller, Ohio State University, Columbus, Ohio. Can supply: Elm Leaf Beetles (larvae, pupae, adults). Would like to receive: Rat-tail Maggots.

Advantages of the Micro-Projector in the Biology Classroom

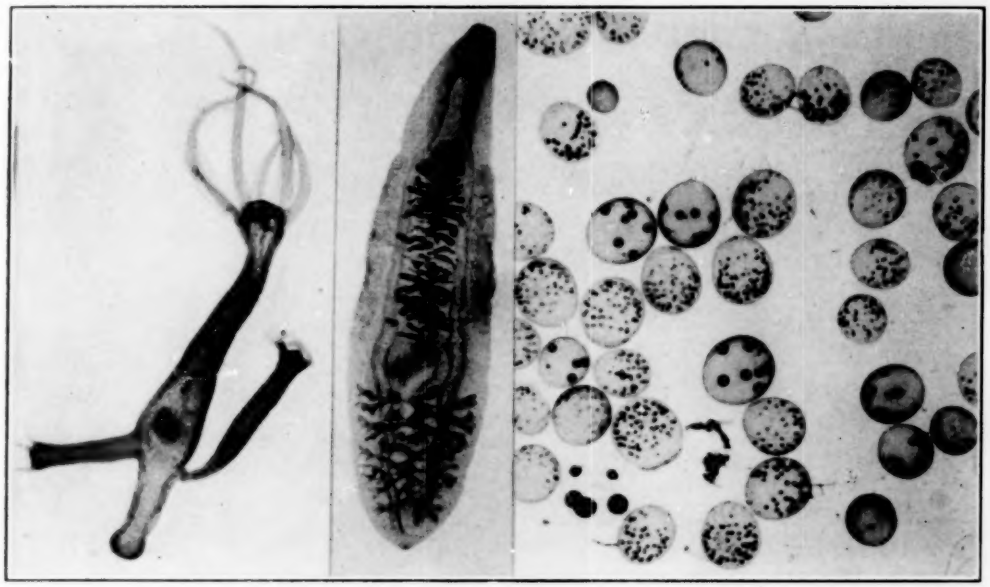
HELEN TROWBRIDGE
Glenbard Township High School, Glen Ellyn, Illinois

The teacher who is fortunate enough to have a micro-projector for her classroom has many problems solved for her. No one realizes better than the instructor the impatience of the high school student when he is attempting to see things under the microscope. To sit for hours trying to discover this structure or that, as a whole, does not belong to this age. In addition to this situation, the teacher cannot help all students simultaneously to see the specimen to be observed. Because she can't, there is an opportunity for restlessness and confusion which cannot but affect the whole class. Some students never are able to focus a microscope; this, too, is a hindrance to the teacher, for the continual use of time for this purpose keeps her from accomplishing what she has planned for that period. Then, still another problem that arises for the teacher is: does the student really see the specimen? The above-mentioned difficulties are removed when the micro-projector is used; the teacher as well as the students can see at one time the organisms in their entirety or that section which the teacher is presenting.

The micro-projector is composed of a compound microscope and an apparatus for projecting light through the microscope and casting an image, enlarged several times its original size, on a screen. The amount of enlargement is determined by the distance the machine is from the screen. It is said that the machine can be used fairly successfully in a semi-dark room. Personally, I find that a room that can be totally darkened gives far better results and casts the image with much better precision.

With the use of the micro-projector the teacher can choose a few of the most capable students and train them to take full charge of the projection. Thus she is left free to direct the students' attention to the organism or structures which she considers vital in that particular phase of biology.

The micro-projector can be employed to advantage in presenting and clarifying many aspects of biology. With the aid of this machine live specimens as well as preserved ones are made available for the students' observation. The amoeba, paramoecium, vorticella, stentor, euglena, bacteria, rotifiers, smaller crustaceans, aquatic insect larvae, round worms, flatworms, yeast, hydra, planaria, blue-green and green algae, diatoms, desmids, and many other microscopic forms can be examined and generalizations made concerning such instructional points as their structures, their methods of locomotion, food getting, sensitivity and reproduction, and their behaviors in relation to each other. Preserved specimens can also be used to advantage in cases in which it may not be possible for the teacher to secure the live specimens, or perhaps expedient, from the standpoint of time and accuracy, for her to prepare sections of live specimens. For example, such invaluable teaching aids as stained slides showing the structural details of sections of typical organisms, or the stages of mitosis in cells such as those of the Allium root tip, or prepared slides of whole



Photographs of a budding hydra, liver fluke and volvox, made with the aid of a microprojector.

specimens such as ciliates of cattle and trichina of pork might not be at hand were it not for the preserved specimens.

A few of the advantages of the micro-projector in group instruction have been set forth in the foregoing paragraphs. The ingenious teacher will naturally find other uses than those listed. Briefly, the micro-projector is an asset in classroom instruction: valuable time and often the patience of the teacher and the students is conserved; fewer good specimens of a given kind are needed, consequently, effort and money can be expended to increase the variety of projection specimens; and instruction is improved as all individuals have an equal chance to see the specimen,—their attention is not diverted by attempting manipulation as so often happens when the microscope is operated by individual students.

ADDRESS CHANGES

should be sent to the secretary-treasurer, Mr. P. K. Houdek, Township High School, Robinson, Illinois.

NOTICE TO NEW YORK MEMBERS

Any association member having paid an initial membership fee of twenty-five cents may receive the AMERICAN BIOLOGY TEACHER by paying an additional seventy-five cents. Payments may be made to Miss Lucy Orenstein of Evander Childs High School, or direct to the treasury of the N.Y.A.B.T.

This type of membership applies only to those teachers already receiving a journal devoted exclusively to the biological sciences, as the New York group. It does not apply to other groups similar to the Illinois High School Biology Teachers Association and others that have a journal devoted in part to biological material and part to an allied field.

Editorial Comment

VIVO EX VIVO

The National Association of Biology Teachers has not developed de novo. We have found that the germ from which it has sprung, has retained its vitality and potentiality for growth. We, who have experienced its emergence, are now anxious to see it mature rapidly.

The splendid cooperation of our members and friends has confirmed our expectations that The National Association of Biology Teachers and its periodical THE AMERICAN BIOLOGY TEACHER would be received with an enthusiastic welcome. More than ever before we have the utmost confidence that our objectives will be realized. With your assistance we gladly face our job of serving the needs of biology teachers and biology teaching everywhere.

I. A. H.

PRESIDENT'S MESSAGE

Only within the last two decades has biology been generally recognized as a separate subject. The spread of biology since its inception into the curricula of high schools has been phenomenal. This formation of a national association might seem superficial to the casual observer since it was the culmination of an extremely rapid growth and expansion of the subject. However, every move during the formation of the association was marked by careful deliberation and extreme meditation by its organizers.

As to who conceived the idea that a national association should be formed is difficult to determine. It seemed to precipitate in all sections of the country at once. This was encouraging and indicated there was a need throughout the country for some unifying force. It is hoped this need has been met.

Reasons for the existence of a national association are numerous. The large number of biology teachers necessitates a common basis for determining problems. Some of the problems existing are what should be taught, what is the best method of presenting that material, and the various devices for presentation. The journal should help to solve these problems.

The future of biology as a separate subject depends upon how well biology teachers meet the life situations of their charges. The most pressing demands are for the dissemination of biological knowledge and a permeating of this material into other subjects of the time. It is possible for biology to disappear as a separate subject from the curricula but the teaching of biological principles will remain as long as there is a scheme of education.

The present group of officers represents but a fractional minority of the individuals responsible for the formation of the association. Special mention should be made and thanks given to members, the chairman and representative of the Committee on Biological Science Teaching. They have spent much of their time and effort over a period of many months in aiding and crystalizing the organization. Thanks should especially be made to Dr. Riddle for his success in petitioning and obtaining a grant from the Carnegie Institution of Washington. The national association will always be grateful.

This committee, delegates from various sections of the country, and others have perfected the association—they placed it directly in the hands of the secondary school teachers, it is up to them to carry on.

M. C. LICHTENWALTER

News and Notes

Of Local Organizations

CHICAGO ROUND TABLE

The Chicago Biology Round Table under the direction of president Lichtenwalter is in the midst of an interesting fall program. The first meeting, September thirtieth, was devoted to the perfecting a study program that is being inaugurated and in addition observing a sound film of biological interest from Africa. The October eighth meeting was a field trip in the Chicago area under the direction of the members of the staff of the Natural History Survey cooperation with Forest Preserve District of Cook County.

Subsequent meetings will be held on November eighteenth and December sixteenth. An attempt is made to alternate the programs. One meeting is devoted to a guest speaker while the following meeting is generally given over to a member of the group doing a creditable piece of work in teaching biology.

Meetings are open to any one interested in the work of the Round Table or any particular program scheduled. All meetings, except field trips or outings, are held in the Cafe of the Medical and Dental Arts Building twenty-third floor. The location is 185 North Wabash Avenue at the north east corner of the Loop. Meetings are scheduled at six fifteen in the evening and the program is preceded by a dinner.

ILLINOIS BIOLOGY TEACHERS' ASSOCIATION

The Illinois association meets annually as the biology section of the High School Conference held by the High School Visitor of the University of Illinois.

The meeting of Nov. 4, 1938, will have a morning session at nine o'clock and an afternoon session at two o'clock in room 228 of the Natural History Building in Urbana, Illinois.

The following numbers have been secured for the program:

"The Coming of Man." Dr. Fay-Cooper Cole, Department of Anthropology, University of Chicago.

"Effective Usage, Arrangement and Organization of Space in the Biology Laboratory." Mr. J. Roy Byerly, Assistant State Superintendent of Public Instruction.

The Making of Models" (Illustrated by moving pictures). Mr. Alfred Mendendorp, Chicago, Ill.

Report on The National Association of Biology Teachers. Mr. P. K. Houdek, Robinson, Illinois.

Other topics planned for the program include *"Selling Biology to the Community," "Laboratory Atmosphere," "The Field Trip,"* and *"Bacteriology in the Biology Course."*

Mrs. Grace L. Cook of the Champaign High School is president of the Illinois Association and is in charge of the program.

THE MIAMI VALLEY BIOLOGICAL ASSOCIATION

The initial meeting of The Miami Valley Biological Association was held during April of this year. Dr. Miller of Ohio State University presented a plan of organization according to that of The National Association of Biology Teachers. The officers elected were B. B. Vance, Chairman; A. Shellhaas, Vice-Chairman; and Mrs. Jessie C. Rockey, Secretary.

The Modern Biology Laboratory

J. ROY BYERLEY
Assistant Superintendent of Public Instruction, Springfield, Illinois

Modern trends in the teaching of biology have had a marked influence upon the construction, equipment, and apparatus of the biology laboratory in the secondary school. The biology laboratory is no longer a place where pupils work principally upon dead specimens and receive special instruction in the techniques of specialization. Such busy-work was a misuse of the laboratory and resulted mainly in the development of skills which were relatively worthless in life situations. The modern biology laboratory has become a place where the interest of boys and girls in the common living things is stimulated and directed so as to lead naturally to an understanding and appreciation of the simple interrelations of living things. As Dr. H. E. Walters has so aptly said, "The ideal laboratory ought to be a retreat for rainy days; a substitute for out of doors; a clearing house of ideas brought in from the outside. Any course in biology which can be confined within four walls, even if these walls be of a modern, well-equipped laboratory, is in some measure a failure. Living things to be appreciated and correctly interpreted, must be seen and studied in the open where they will be encountered throughout life. The place where an animal or plant is found is just as important a characteristic as its shape or function." Incidentally, let it be said here that the biology teacher should not only be technically trained in botany, zoology, general biology, physiology, and microbiology, but also well trained in paleontology, plant and animal ecology, and economic biology.

There is a tendency today to do more field work in biology and to bring into the laboratory more specimens and materials that are familiar to the students. Biology students show a natural interest in the common living things that are found in their environment.

There is a tendency today to make considerable use of the demonstration-discussion method of teaching rather than the individual method commonly used a few years ago.

There is also a tendency today to combine the functions of the laboratory and the classroom.

These trends in the methods of teaching biology should be taken into consideration when a new biology laboratory is to be constructed or an old one remodeled. The modern biology laboratory of the secondary school should be constructed and equipped so that the instructor can give demonstrations, direct reference reading, hold class discussions, and conduct laboratory work in one and the same room. This arrangement makes possible the elimination of fixed laboratory and recitation periods. The instructor can, therefore, use the time during the teaching period as he sees fit, according to the needs of the pupils, thereby making possible more effective teaching. Thus a single biology laboratory-classroom seems preferable to separate rooms for laboratory and recitation work. The biology laboratory should also be provided with two additional adjoining rooms, (1) a combination workroom and storeroom, and (2) a small room for taking care of living plants and animals. The combination workroom and storeroom should be approximately twelve feet by twenty-four

feet. It should be provided with storage cases, a laboratory truck, tables, a work-bench, a sink, water, gas, and electric outlets. The work-bench should be provided with a vice, a drawer for tools, and a good outfit of tools for working with wood or metal. These things are necessary so that the originality and the creative ability of the biology students can be encouraged. The room for taking care of living things should have the general "greenhouse" construction and be located so that direct sunlight will be assured. This room should be connected directly with the laboratory-classroom and be provided with adequate heating and ventilating facilities. It should also be provided with florists' benches and a permanent aquarium. If it is impossible to provide an extra room for living things, provision should be made in the regular laboratory-classroom for growing plants and keeping live animals.

Now let us consider some of the features of the laboratory-classroom itself. How large should it be? How should it be lighted, ventilated, and heated? What equipment and apparatus should it contain?

Size of Room

In order to accommodate the biology enrichment materials the laboratory-classroom should be slightly larger than the ordinary classroom. The actual size of the room must, of course, be determined by the maximum size of the classes. However, there are some general standards which should be considered. The width of a room, if unilaterally lighted, should not be more than twice its height. Ordinarily, a laboratory should not be less than twenty or more than twenty-four feet wide. A room twenty-four feet wide should have a height of at least twelve feet, so that the windows may be made high enough to insure adequate natural light in all parts of the room. The length of the room should be determined by the desired seating capacity. There should be approximately seven feet between the front wall and the first row of seats. There should also be at least thirty inches between the last row of seats and the rear wall and about the same amount of space between the desks and the outside wall. The distance between the inner wall and the desks should be approximately six feet. This space makes allowance for storage space and extra tables.

Heat, Ventilation, and Light: Natural and Artificial

The heat and ventilation in a biology laboratory-classroom are expected to be standard and will not be given further consideration here. However, the light is so frequently found inadequate that it seems desirable to give it special consideration.

The light of a schoolroom is a matter of far greater importance than people generally realize. It is a significant fact that studies have shown that a high percentage of students of high school age suffer from defective vision. Studies have also shown that the increase in defective vision in some instances follows a direct and accelerated ratio of advance as students pass from grade to grade. Frequently pupils fail in their school work because they cannot see well. Therefore, in planning a biology room one should consider the quantity and quality of light. Fifteen foot-candles on each desk should be regarded the minimum and perhaps twenty foot-candles would be better, especially when we consider the fact that our eyes were developed to see outdoors where the intensity of light is as much as 10,000 foot-candles. Many biology laboratories have an average of less than five foot-candles of light. In visiting schools one can almost in-

variably observe the physiological and psychological effects (irritability and retardation) of poorly lighted laboratory-classrooms.

There are many factors which affect the quantity and quality of light. In the first place, the room should be unilaterally lighted. And since most students write with the right hand the windows should be placed on the left side for the avoidance of shadows. The top of the window glass should extend to a height above the floor equal to at least half of the width of the room in order to make available sufficient natural light on the desks along the wall opposite the windows. This is the reason for recommending that no room be wider than twice its height. Windows should be placed as near the rear wall as possible but they should not extend beyond the front row of desks—that is, within approximately seven feet of the front wall. Windows should seldom be placed in the rear of the room. However, if they are placed in the rear they should be at least six feet above the floor. The piers between the windows should be narrow in order to prevent the casting of shadows. Student desks and chairs should be arranged so that the pupils will not be forced to sit facing the direct natural light.

In visiting schools, one finds many classrooms inadequately lighted even though the glass area in the windows is sufficient and the natural light outdoors is abundant. This is usually due to the poor quality of the shades or to the fact that the shades have not been properly adjusted. Sometimes school buildings are surrounded by too many tall trees or other obstructions which prevent the natural light from entering. Dirty windows and light fixtures greatly decrease the quantity of available light. The light on the desks along the wall opposite the windows is most frequently found inadequate.

This problem can partly be solved by equipping the windows with translucent shades of the double roller type hung at the middle of the windows so that one part can be drawn upward and the other part downward. There should also be a bar between the rollers to prevent the entrance of streaks of light. It has been the observation of many supervisors that this type of shade is more likely to be properly adjusted than the single roller type which is hung at the top of the window. It must be remembered that the natural light on the desks along the wall opposite the windows comes from the top of the windows. Pupils seated next to the windows often receive twenty times as much natural light as those who sit on the far side of the room.

Lighting luminaries should be hung rather high so that they will be above the normal line of vision. The globes should be of sufficient density to conceal the light element within.

The best form of lighting is indirect or semi-indirect in which cases the output is largely upward. General diffused lighting systems cost less to operate than indirect or semi-indirect systems but they are also less satisfactory for laboratory-classroom purposes. The row of lights nearest the wall opposite the windows should be installed so that it can be switched on separately in order to supplement the light on the desks in the darker parts of the room. The intensity of these lights should also be greater than that in the row of lights next to the window.

Photoelectric controls which have been developed to turn on or turn off the artificial light, are a very useful device since individual judgment cannot be relied upon to determine by visual observation

when more artificial light is needed or when it can be spared. The light in the laboratory should be measured frequently with a light meter.

Location of Biology Room

The biology laboratory - classroom should be located on the first floor if possible. This location makes the laboratory-classroom more convenient for bringing in materials and also helps to decrease the disturbances made by the classes when leaving or entering the building on field trips.

Biology Laboratory-Classroom Equipment: Furniture, Fixtures, and Other Necessities

Generally speaking, laboratory-classroom furniture should be purchased from factories specializing in making such material. The furniture of a laboratory-classroom must be well constructed, and its construction involves many problems not understood by anyone except those who have made a special study of the subject. Experience has shown that ordinary cabinet work does not stand up under the abuse which laboratory-classroom furniture is bound to get.

There are many standard types of biology laboratory-classroom tables in general use. The Lincoln, the Horace Mann, or a similar type of table is frequently used. It is sometimes also called the Aeroplane or Multi-Service table. It consists essentially of a long cabinet with wing tables extending out from each side. One student works at each wing. Gas, electricity, water, and drain can be provided either in the wings or in the center. This type of table is especially adaptable to laboratories where other than biology classes are conducted in the same room. In case these student tables are used in laboratory-classrooms where biology classes only are conducted, the gas, electricity, water, and drain features can be omitted. This type of table requires a slightly larger floor space than other types of tables and will cost more. However, it permits all the pupils to face the same direction and makes a very satisfactory biology laboratory-classroom table.

Two-student tables are also commonly used. Such tables are usually five feet long, twenty-four inches wide, and thirty inches high. Two students work on one side of each table. This type of table costs less and takes less floor space than the Multi-Service type.

A biology table should have a small drawer about four inches deep for individual student use. All drawers should have locks with master keys. Comfortable chairs should also be provided. Folding chairs are unsatisfactory. Each school should select the type of table which seems to have the largest number of advantages under local conditions.

There are a number of other items which one must not overlook when equipping a laboratory-classroom, such as an instructor's chair and desk, a built-in notebook case, a museum case, book shelves, a library table, a key cabinet, an apparatus case, and a stock case. The built-in cabinet space should be along the corridor side of the room. There should be a blackboard of at least ten linear feet located behind the demonstration table. It is very desirable to have additional blackboard space. A sliding blackboard about ten feet long located behind the demonstration table is very convenient. The biology room should be provided with a good bulletin board, a first-aid cabinet, a laboratory emergency chart, and a fire extinguisher. The bulletin board should be made of cork and contain at least fifteen square feet. It should be located on the side opposite the windows near the front of the room. A biology labora-

tory-classroom should also be provided with a well-stocked aquarium, a germinating bed, a window shelf, and animal breeding cages.

Every biology laboratory-classroom should be provided with a demonstration table with ample cuboard and drawer space. This table should be equipped with a sink, running water, gas, and electricity. The demonstration table should be two and one-half feet wide and from six feet to twelve feet long. The sink should be made of chemical stoneware or soapstone.

Every laboratory should also be equipped with large stone jar receptacles for the deposit of solid wastes to prevent the sinks from becoming cluttered with insoluble refuse. Hardware and plumbing fixtures should be such that they will resist acids and fumes. High grade red metal, triple nickel plated, is said to be better than brass. Heavily galvanized iron should be used for piping water and electricity. Gas pipes should be black iron. All drains should be equipped with pure lead pipes of a heavy weight and all joints should be burned instead of soldered.

The most satisfactory arrangement for running water is a faucet connected to a municipal water supply system from which an abundant supply of water can be drawn, and a sink connected to a sewer which drains away the excess. In case a municipal water supply system and sewer connections are not available, a makeshift may be made by providing a tank with a faucet at the bottom and a large waste jar beneath to catch the surplus and the waste materials. This makeshift arrangement is not a satisfactory substitute and should be tolerated only until such time as running water and sewer connections can be had.

The most satisfactory source of heat for laboratory purposes is gas, either artificial or natural. A school located in a community which is not supplied with municipal gas should have a satisfactory substitute. The volatile hydrocarbons, propane and butane, kept liquid under pressure are called "bottled gases." "Bottled gases" are now used extensively for heating purposes in laboratories. These gases are supplied in tanks or small portable cylinders. "Bottled gas" outfits are not expensive. They can be obtained for $25.00 and up. They go under such trade names as Skelgas, Pyrofax, Philgas, Propane, Butane, etc. Any such gas on which adequate service refills can be obtained will be satisfactory. Some schools are equipped with small gas plants. If gas is manufactured from gasoline at the school the plant should be placed outside the school building and all necessary precautions taken to insure safe use. Some school gas plants seem to work very satisfactorily. Some state laws now require that gas used in public buildings be treated in such a way that escaped gas can be easily detected.

Blow torches should never be used as a source of heat in the laboratory. Alcohol lamps are inefficient and unhealthy and are not recommended.

The windows in a biology laboratory-classroom should be quipped with opaque shades so that the room may be darkened for picture projection purposes.

For those designing and equipping a laboratory, the furnature manufacturers will supply illustrations, prices, and layouts for your room without cost or obligation. Some of the manufacturers of this type of equipment are:

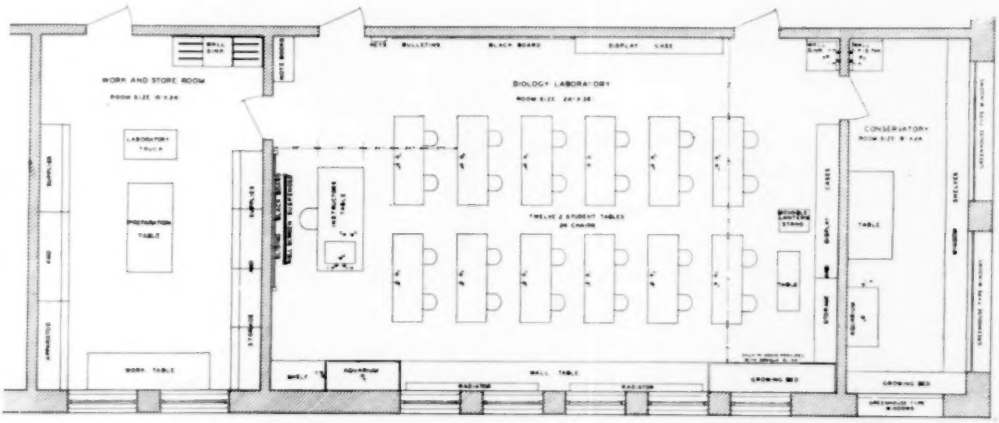
E. H. Sheldon & Company, Muskegon, Michigan.

W. M. Welch Manufacturing Company, Chicago, Illinois.

Hamilton Invincible, Inc., Two Rivers, Wisconsin.

Kewaunee Manufacturing Company, Kewaunee, Wisconsin.

The following diagram is given to help illustrate the suggestions that have been made concerning the laboratory layout and its equipment.



Biology Apparatus

The laboratory layout and its more or less permanent equipment are of little value unless apparatus or materials of a more or less temporary nature are provided. I refer to such materials as glassware, chemicals, and other teaching aids which must be replaced from time to time.

It must be remembered that the justification for the expenditure of considerable money for laboratory equipment and apparatus in high school depends somewhat upon the use to be made of this material, which frequently is used only to develop techniques of specialization. Such use is questionable and the objection to providing elaborate laboratories is probably justified if the laboratory equipment and apparatus are so used. The cost of laboratory equipment and apparatus in high school must be justified on the basis of usefulness in helping boys and girls adjust and readjust themselves to their environment and not on the basis of attempting to develop them into highly specialized investigators.

Purchasing Apparatus, Annual Appropriation, Inventory

There should be an annual appropriation for laboratory purposes in order to maintain the standards for laboratory apparatus. Before the close of each school year the instructor should be required to make an inventory of the laboratory equipment and apparatus. A copy of this inventory should be kept on file in the principal's office and used as a guide in ordering needed supplies. The instructor who has just gone through the course knows best what is needed. It is suggested that the supplies be ordered for August delivery immediately after the close of the school year. Fall dating of bills can usually be obtained by this method, which avoids delays often experienced when orders are placed in September. The person who places the order should specify exactly what is needed. Economy and utility of materials should always be considered. Apparatus should not be purchased unless its use is definitely planned.

Good laboratory work does not necessarily depend on elaborate and expensive designs of equipment. It should rather

be the aim to provide an ample supply of the simpler designs. On the other hand, it seldom pays to buy inferior or lowest-priced materials. Apparatus should be purchased directly from reputable laboratory supply houses. Purchases should be made by selecting from a standard catalog those designs that seem to embody the greatest usefulness and durability. Making up a list of the names of articles and then asking for bids and accepting the lowest bid is perhaps not the wisest way to purchase apparatus. Such procedure encourages sellers to offer the most abbreviated designs, and it is certain that a greater number of undesirable designs will be thus secured than if the school selects the desired articles from catalogs. It is very difficult for a pupil to do good work when he is compelled to use apparatus of a poor quality, such as glass tubing that is off-size and corks that do not fit. A biology teacher should always check the invoice before the bill is paid, and should refuse to accept cheap substitutes which are not in accordance with the specifications.

Science Reference Material

One of the objectives of good biology teaching is to stimulate the use of reference material. Selecting and reading reference material should become the habit of every science student. Some reference books, pamphlets, and magazines should be checked out of the library and be placed on a shelf or table in the laboratory. Such materials, of course, should be returned to the main library as soon as they have accomplished their purpose. It is not within the province of this article to list reference material for biology. Many good lists are already available. Perhaps one of the most outstanding is that published by Professor H. A. Webb of George Peabody College, Nashville, Tennessee. This list contains approximately a thousand titles of science books for use in high school. The titles are organized according to subjects, and the list will prove valuable in the selection of science books for the high school library. Every high school should secure a copy of this list. It costs twenty cents. Professor Webb has also listed a large number of magazines, classified according to topics. This may be had for fifteen cents. Lists of government publications may be obtained by writing to the Superintendent of Documents, Washington, D. C. The government publishes a number of circulars of great interest to biology teachers. The Standard Catalogue for High School Libraries should be in every high school library. This is published by H. W. Wilson Co., 963 University Ave., New York City.

Care of the Biology Equipment and Apparatus

In visiting high school laboratories, one is frequently impressed with the careless way in which the apparatus is kept. In most cases this condition is due to a lack of storage space. As nearly as possible, there should be closed storage for all of the apparatus. Expensive apparatus such as microscopes and balances should be protected from dust. Cases with glass in the doors are best (except for certain chemicals) because the articles can be quickly located. It seems best to have a place for each article, or class of articles, and have a label and number by which each may be instantly located, even by an individual not familiar with the laboratory.

The human element is also important. A careful science teacher will keep an orderly laboratory. The science department should not be cluttered with useless material. It should have a complete housecleaning once or twice a year. The teacher should enlist the cooperation of

the pupils in keeping a neat and attractive laboratory. Broken and useless apparatus should be discarded. Each piece of useful apparatus should be catalogued and kept in its proper place. The training that pupils receive under instructors who practice these suggestions is quite valuable. Therefore, the training of boys and girls in the proper care of apparatus should be a part of the laboratory course.

Every container should be labeled to identify its contents. Labels on containers may be protected from corrosion by being covered with shellac or a thin film of paraffin.

Many living things can be found and studied out-of-doors. other living things for practical purposes must be brought into the laboratory and observed. Therefore, provision should be made for the care and study of the living things that are brought into the laboratory. An aquarium, a window box, flower pots, breeding cages, battery jars, etc., are indispensable in a biology laboratory.

A micro-projector is a valuable aid in connection with biological demonstration work. This device does not displace the microscope. It does decrease the number of compound microscopes needed in elementary science classes. In cases where a good micro-projector is provided, there should be at least one compound microscope for each eight pupils, and if funds are available, one for each six pupils. If a micro-projector is not available, there should be one compound microscope for each four pupils. It should be remembered that for the majority of the pupils, the biology course will offer the only opportunity they will ever have for seeing microorganisms and thereby realizing their existence, with a resultant development of health education. Every biology student should see the moving chloroplasts in a green leaf such as the elodea. Of course, in large schools where botany and zoology are taught as specialized subjects, there should be one compound microscope for each two students and preferably one for each student. There should be at least ten biology charts. Models of the eye, ear, heart, skull, skin, and torso make a satisfactory substitute for extensive dissection, which is not very practical in high school. Mounted specimens of the life history of various animals are also very useful. Every biology laboratory classroom should be provided with some kind of picture projection device.

Students can often be interested in projects which will result in adding useful materials to the museum. High school students can be encouraged to make valuable insect collections, life history mounts of insects, models, charts, and skeleton mounts of animals.

A detailed list of the temporary apparatus or materials necessary for teaching purposes cannot be given here. However, an estimate of the approximate costs of such materials may be helpful for budgetary purposes.

Sometimes more apparatus than just the minimum to meet approval is desirable. An estimate of the cost of this additional apparatus is given in the summary.

ESTIMATE OF THE COST OF APPARATUS FOR BIOLOGY

Biology

Individual Apparatus (For a class of 24 working in pairs)	$ 55.32
General Apparatus (One set for class)	188.60
Live and Preserved Material (For a class of 24 working in pairs)	70.95
Chemicals (One set for class)	9.96
Total	$324.83
Additional Desirable Apparatus	$349.03

Biology for Contemporary Youth

HERBERT A. DWYER
Roosevelt High School, Dayton, Ohio

If biology is the science of life and all its manifestations then some coordinating principle should have been derived, long ago, between the existing facts of life and the teaching of those facts so that they would be helpful to the youth of the nation.

Ignoring the urgent needs of youth the biology teacher assembled in the past a veritable bedlam of isolated facts in his texts and syllabi. These inadequately illustrated his precious principles of hereditary ratios, anthropomorphic illuminations, victorian sentimentalisms, taxonomic hieroglyphics, unseasonable ontogenies and phylogenies, ad infinitum.

He assumed that his systematics, because of their rational presentation, were psychologically assimilable by young people. He was worried over the unit plan and projects, the functional and type courses. His teachers colleges were constantly in the throes of intellectual agony, as they are today, over the downfall of progressivism and the new ascension of elementarism.

Truly, the naturalistic, progressive viewpoint toward these matters had never been established. Biology teaching rarely extended itself beyond the day of Thomas Henry Huxley in actual practice. The exception was the master artist teacher who understood youth and forgot pedagogical theory.

In fact all of this disregard for scientific educational facts emerged from a fundamental disregard for the focal point of education, namely, that of the pupil. The actual answer to the dilemma has never been in the materials of the laboratory but in man. Witness the clearest illustration in the eminently successful C.C.C. experiment. This program, maintained by the U. S. Army and not by an educational institution has approached the solution of the problem and set a standard for all time.

Here life and learning approach closer. Simple biological concepts are entertained in only practicable and workable situations. The healthful, wholesome, constructive efforts manifested in the program are far removed from the pressure techniques of the systematized encyclopedic biology teaching in our schools.

Modification of the paper and pencil classroom methods will be necessary ultimately in order to acquire the status of the C.C.C. program, for excellence in educational results.

This must be done and can only be done when the pupil is foremost in the educator's mind. With the pupil as the end and theory, principles, materials of the laboratory as the means, an about face, in the right direction can be secured.

From recent studies as the National Survey of Secondary Education and the Youth Commission of the American Council of Education new truths regarding the new entity, present day youth, will give a new orientation.

In the monograph on Secondary School population of the National Survey of Secondary Education and in the Youth Commission survey of Maryland "Youth Tell Their Story," the biology teacher may discover a different situation than during his day. Many suggestions necessary for a new and basic viewpoint of biology teaching can be derived from their discoveries.

Some are; over twenty million young people from fourteen to twenty-four have been bequeathed by past generations a frightful spectacle of incompetent social-economic philosophies, economic depravations, devastating indebtedness, slum areas, depleted natural resources, broken homes, mental disease and endless problems which should not have been their heritage.

There is a different pupil in the secondary school. A goal is being set to include all boys and girls up to the age of eighteen. The trend of the I.Q. average has been downward with the increase of population. Today those with an I.Q. of 100 are found less often than before. The college preparatory concept of the Secondary School is definitely obsolete. The tremendous economic and technological barriers to successful vocational enterprise prevents any specific training in specific occupations. The trek to the city definitely means an urban centered youth.

Young people claim their greatest problems are found in economic security, the need for vocational guidance, attention to the problem of understanding how to choose a mate, how to adjust successfully with people their own age, how to properly use their leisure time.

Interest in biology will necessarily grow out of these interests and tensions found in the normal youth. The resolution of these problems and the creation of programs for participation in activities which will clarify their position in the world cannot be secured by a return to the superimposition of intellectual systems of scientific thought upon the already burdened mind. All the necessary principles of biology which have been conjured by biological scientists can be studied with a new orientation. The actual viewpoint must be different. Pupils must reserve life problems for scientific answers. The educator must begin with the problem of the pupil and eventuate in the understanding of the problem by a survey of biological facts and principles.

If we can agree with Herbert S. Jennings in his "Universe and Life," that "the daily, the hourly, occupation of most organisms—high or low—is the seeking of conditions that are favorable for life and the avoiding of conditions that are unfavorable," then the problems of youth will be respected and interpreted in the light of such a science.

THE AMERICAN BIOLOGY TEACHER

Publication of The National Association of Biology Teachers.
I sued monthly eight times during the school year from October to May.
Correspondence concerning manuscripts may be addressed to any of the Associate editors or directly to the editor-in-chief.
Business correspondence regarding advertising etc. should be addressed to the managing editor.
All other communications should be addressed to the secretary.

Application for entry as second-class matter applied for.